Proceedings of the University of Kansas Symposium on Auditing Problems	Deloitte Collection

1-1-1974

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Recommended Citation

Contemporary auditing problems: Proceedings of the Touche Ross/University of Kansas Symposium on Auditing Problems, pp. 089-108;

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The Sample of One: Indispensable or Indefensible?

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Touche Ross & Co.

Discussions and controversies among auditors about sample size have long been active. I personally experienced them since, at least, when detailed audits were becoming universally recognized as unable to serve society's needs for information about ever-enlarging enterprises. Today, however, a new relevance and urgency arises about the question of sample size. Uncensored answers to the question may present a challenge to the entire philosophical underpinning of auditing practice.

The new relevance arises because of two—not entirely unrelated—developments. The first is the articulation of Systems Theory. The second is the growing loudness of the cry by Society that the justification for technology has not been based upon humanistic values. Demands are growing that creators and users of technology be responsible for whether it contributes to or detracts from human welfare. Increasing attacks come from Society against values which give virtue to technology with assertions that objectivity or freedom overrides responsibility for human impact.

Challenge to Auditors

What is the relevance to auditors of this advancing environment? If the profession believes this is an environment in which it can survive by circumscribing itself so that the quality of its work will be judged only by its peers then it can continue on its present course. The peers can continue to argue about 95% confidence limits, or 50% limits. They can argue about how to combine compliance testing with substantive testing. Once they agree with each other about all these standards or procedures, all will be solved. Certainty will be achieved on how one's work will be judged. The upper hierarchy of knowledge will be in the saddle.

However, Society's enlarging position makes me believe that users of financial information will continue to shout—ever louder: "Hey! You guys aren't talking about anything that affects me! You argue about standards and practices of auditing in areas that by careful definition exclude what I want to know. Are the financial statements a *fair presentation*[2] of the information I need for *my decisions?* I don't feel any better if unfair presentation comes from management fraud, collusion, or because generally accepted accounting principles bring about that kind of result."

My view of auditing encounters threatening forces calling now for resolution of the mutually exclusive questions of how is "good" auditing to be judged:

By evaluation by one's peers as to compliance with standards?

By pragmatism and utility in the eyes of the users of financial information?

Why a Sample of One?

For me, the use of samples of one[3] spearheads a philosophy of auditing practice that opposes the prevailing audit-practice philosophy. The prevailing philosophy leads to a methodology that predominantly looks to justify its soundness by the use of sample sizes that comply with standards or rules derived externally from a specific audit. The sample of one is a tool for *discovery*—for the exercise of creativity by an individual. The externally derived sample size is a tool for *inspection*—for bringing about conformity, for controlling the work of others.

The thesis of this paper is that auditing approached with a methodology logical for inspection is not utilizing the methodology logical for meeting Society's demands for pragmatism and utility. Use of tools that bring about conformity and control of the work of employees is inconsistent with "good" auditing. Auditing involves evaluation of and judgment about interactive systems, not of mechanistic systems. Therefore, if the quality of the results is to be judged by pragmatism and utility in the eyes of the user, I perceive that auditing must use tools suitable for discovery and creativity. The stakes may well be the future role of the profession in Society.

The thoughts presented in this paper are directed to the level of institutionalized concepts that directly affect and strongly influence what auditors *actually do*. The vast auditing literature, like the Bible, undoubtedly contains all the imperatives necessary for doing a satisfactory audit. But these imperatives do not have the force of the institutional environment for influencing an auditor's behavior. Effectiveness of auditing cannot be judged by only looking at its prescriptions; auditing must be judged by what human beings do. "Use judgment," "Be creative," "Ask good questions," "Obtain adequate substantiating evidence," are imperatives which, if they are to be incorporated in behavior, must be institutionalized in a process which is not overridden and contradicted by specific and immediate directions and feedback. This paper is directed to this level of institutionalization.

The Mechanistic Approach

The implied (if not explicit) philosophy of auditing practice, particularly as expressed by Statement on Auditing Procedure No. 54, is that auditing is an inspection process of "stupid" objects. Statistical quality control is the most advanced use of science for performing the inspection process. The principles were developed in contemplation of outputs (work done) which do not have a purpose of their own and which do not interact with each other. That is, the outputs are independent of each other and cannot adapt themselves to a purpose. The characteristics of the first unit produced do not act as a force to change

what unit five or any other unit will look like. Unit five cannot change itself because of the way unit one looks. All this contemplates behavior of objects which are "stupid."

The inspection process of physical (stupid) objects has characteristics which are distinctly different from those possible in auditing. The inspector looks for dimensions or qualities which specifically and unequivocably are intended to *determine the utility* of the product. Its length, weight, color, smoothness, response become direct means for determining good or bad product. The nature of "errors" need not be *discovered,* only their existence or non-existence—based upon the inspection standards—needs to be *observed.*

Under these conditions, laws of probability logically and usefully apply to ascertain the existence of "errors" in the universe. Confidence limits relative to precision are thoroughly sensible.

The Living System

Auditing, in common with other studies or activities related to organizational behavior, up to now has been heavily influenced by the methodologies so successfully used in physical sciences and its related technologies. But there is growing recognition among management scientists and other social scientists that continuation of a posture suitable for the physical sciences may bring about extinction of their disciplines.[4]

Accounting information is a representation of a living system, not of a mechanistic one. The accounting process is itself a living system. Accordingly, the audit process encounters characteristics significantly different from those encountered in the physical inspection process. In auditing, the objects of study are not "stupid." Differentiated characteristics of the audit process held in common with living systems are:

1) Signals (observable characteristics) emanating from the output (work done) during stages of processing a transaction are equivocal. The signals do not uncontradictably identify "good" or "bad" characteristics that affect the utility of information to a user.
2) The signals emanating at the processing stages do not provide information that can be demonstrated to be useful for establishing empirically the expectation for errors in the aggregated end results of the processing.
3) The utility to a user of the aggregated end-results of information processing is affected by material errors or deviant behavior that exist in highly complex functional modules. These modules are the results of interactive, self-adaptive functioning of many intermediate processing stages. There are *no independent signals* that unequivocally identify the existence or non-existence of errors or deviant behavior in these modules.

I will talk about each of these assertions.

What is the Error?

A missing approval on a return sale voucher or a missing receiving slip on a payment voucher does not identify errors of interest to the users of accounting

information. Unlike deviations in length, weight or color of physical objects, the observed deviations in the return sale and the payment voucher are not the characteristics which affect utility to the user. A credit for a return sale which should not have been granted is an error. But the unapproved credit is not necessarily an improperly granted credit. Worse yet, approved vouchers may include improperly granted credits. Because the processing of outputs is self-adaptive (not stupid), at different times the approval or disapproval may signify different things.

Whether or not it is efficient to track down unapproved credits in order to ascertain "goodness" or "badness" should be clarified by the material presented later in this paper. But for now, observe the ambiguity that comes to the auditor from ascertaining "goodness" or "badness" at lower levels of processing. Assume a finding, after investigation, that an unapproved credit is in fact appropriately and correctly issued. This could be a result of many causes:

- The credit was correctly prepared in the first place.
- The credit was corrected because of the review process even though the reviewer did not reflect his approval by initialling.
- The psychological impact of a pending approval motivated the preparer into doing proper work.
- The force of system interactions beyond the reviewer either brought about correction or created the psychological impact that motivated the preparer into doing proper work.

Expectations of Errors

With all the explanations and meaning that are possible when there are unapproved returned sales credits, the significance is slight whether approvals, undifferentiated as to significance, are present 99%, 95%, 90%, or 75% of the time. A prediction model for forecasting the frequency of future errors cannot be expected to be validated empirically when the model is derived from such data.

The interaction of approving return sales credits with other control steps can logically be expected to affect error rate. But the signals from other control steps are just as ambiguous as those for return sales credits. I cannot imagine how complex interactions of ambiguous signals can be used successfully to establish, empirically, expectations of errors to be found in the end-results of information processing.

A serious attempt to deal concretely with expectations of future error and, therefore, to compute reliance that can be given to internal control is set forth in an article by Barry E. Cushing.[5] This article was very useful to me. Although not the intention of the author, it identifies specifically the difficulties (impossibilities?) of computing the reliance to be given to internal control for catching those errors which affect the utility of information to the user. I simply want to point out a few things in this article that I think make my position clear.

First, the article does not deal with an interactive world but arbitrarily defines its world so that it has a mechanistic character. "A feedback control may provide a useful supplement to a system of preventive controls by monitoring the performance of a system. However, discussion of modeling techniques which

apply the concept of feedback is beyond the scope of this paper."[6] (This quali-fying reference to feedback probably does not contemplate all the complex in-teractions and the teleological behavior which in fact exist beyond *direct* feed-back mechanisms.)

Second, after excluding by definition a very important part of the real world, the author expresses the need for parameters among which are the following:

1) $p =$ the probability that the process is correctly executed prior to administering the control procedure
2) $P(e) =$ the probability that the control step will detect and signal an error given that one exists
3) $Ve =$ the estimated average dollar effect of a single undetected error of type i on the balance of the account

He asserts about the required parameters: "The basic implementation problem . . . is the derivation of estimates of the probability and cost param-eters . . . Estimates . . . can be developed from (1) records of error frequen-cies and error correction procedures maintained by clerical personnel who perform the control procedures and (2) data collected by internal or external auditors . . ."[7]

He also states: ". . . estimates for Ce and Ve for the case of embezzlement may be meaningless or impossible to estimate from past experience. . . If infor-mation of this type (experience about embezzlement) is not available, the re-liability model may be of limited usefulness in examining control procedures which are intended to prevent embezzlement."[8]

Note then the circumscribed world to which the model applies:

- Excluded from the model are the efforts of interactive systems and of embezzlement. (The utility of information to users would not exclude these two factors. What is the significance of "Ve" computed with these limitations?)
- The called for parameters appropriately relate to *real* "errors," not to the frequency of omissions in an audit trail. (Real errors that can be reliably identified in the manner envisioned by the author must be mechanical, low-level operations with virtually no expectancy for self-adaptation or for changes from interaction. This excludes sig-nificant areas of the accounting process that are of great interest to the user of information and the auditor. Subsequent discussion gives support to this comment.)

Concerns of Auditing

Before attempting the important job of identifying the functional modules that are of intimate concern to users of financial information, I would first like to address some concepts about the fundamental concerns of auditing.

Accounting information constitutes a model. The model represents and, therefore, gives information about the status of a business system. This model involves accounting principles designed as a means—a language and a logic—for describing that which may exist in a business system. Thus a prime auditing question is whether that which has been *represented* as existing in terms of the model also *exists in fact*. An error, or non-congruence between the representa-tion and the fact could come from several causes:

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1) The language or the logic has been misused or misapplied, or is inadequate to fairly describe that which is known to exist.
2) An existing fact which the model contemplates should be identified has been overlooked or erroneously measured.
3) That which is known to exist in fact has *purposefully* not been described either by omission or by substitution of a description of a non-existent fact.

Recorded accounting information is the output of a living system. The status (health and condition) of the business system being represented is disclosed not only by giving the results from classifying the external and internal transactions into which the business has entered, but also by incorporating into the model relationships (attributes) that cast light upon the influence of these transactions upon future transactions. These attributes include collectability, saleability, recoverability, etc. Thus, the presence of certain attributes of assets and liabilities are recorded in addition to the bare transactions.

Attributes result not only from the nature of the transactions, but perhaps more importantly from economic events that occur or exist in the environment and from entrepreneurial decisions. Economic events include loss of market to competition (may affect saleability of inventories), new inventions that cause obsolescence, troubles in the business situation of customers, change in market prices, etc. Entrepreneurial decisions can obsolete products, plants, etc. or, contrariwise, they can keep life aflame in assets, such as investments made in research. In summary then, accounting information represents the state of a business system that results from the interactions of functional modules, as displayed in Figure 1.

A primary issue concerning the utility of the information is whether or not the results of the interactions of the modules shown in Figure 1 give a *fair presentation* of that which *exists in fact*. This issue extends much farther than whether transactions have been authorized and the mechanics of handling and recording are relatively error free. Auditing is challenged to face this broad issue in being measured as to its pragmatism and utility.

Modules of Recorded Accounting Information

Transactions with outsiders

Internal activity

External activity

Entrepreneurial decisions

Measuring and recording procedures

Organization structure and operating procedures

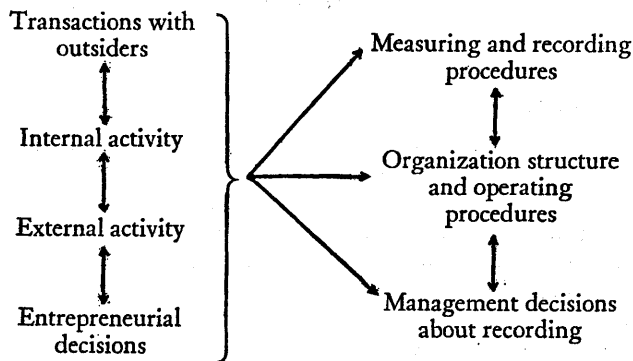Management decisions about recording

FIGURE 1

Errors in Complex Functional Modules

Several times reference has been made to functional modules that are of intimate concern to users of financial information. The presentation thus far has been directed towards making evident that such modules must involve recording functions at a level that is germane to the primary question of what the model represents as existing. Deviant behavior of these modules constitutes errors which affect the primary interest of the user of the information. I identify the deviant behavior that constitutes errors expressed in terms of such modules as follows:

1) Errors that relate to the recording of transactions:
   a) Monies received but not so recorded—representing diversion of receipts from credit sales, cash sales of merchandise and miscellaneous cash receipts
   b) Monies paid for non-business purposes (payments that divert monies of the business)
   c) Non-bona fide sales recorded
   d) Non-bona fide assets recorded—assets falsely represented as identified by count, and assets physically lost or stolen not recorded
   e) Liabilities incurred but not recorded
   f) Transactions classified or clerically processed so as to bring about misrepresentation of attributes which exist in fact
2) Errors in recording the occurrence or existence of external events, entrepreneurial decisions, and internal activities that affect those *attributes* of assets or liabilities which the model contemplates should be recognized

First, a few thoughts that may result just from studying the classification of errors presented.

One, the type of error that can be ascertained from an inspection methodology exists only in the last listed transaction module (1f)—a module likely to cause the least difficulty.

Second, the assessment of the significance of errors is *not* to be accomplished by ascertaining the dollar value of errors in an account balance. The account balance approach was contemplated in the article by Barry Cushing in his parameter Ve.[9] On the contrary, it is proposed that significance of errors (and utility to the user) is to be related to the business function being recorded. The functions identify and define roles that the user wants served in the recording system; an error is behavior that deviates from expectations of how the role is to be served.

Third, there may be all kinds of unauthorized execution (in the sense of lack of approvals, etc.) in the selected functions, but these "errors" do not add up to, or predict, or have a demonstrable effect upon the errors which concern the user.

Fourth, each of the user-level functional modules comprise many interacting functional elements at several hierarchical levels. Recognition of the nature of this complexity leads me to look to a discovery methodology rather than an inspection methodology. An illustration of the elements of one of the systems—Receipt of Monies from Credit Sales—is set forth in Figure 2.

FIGURE 2
Elements of System for Receipt of Monies from Credit Sales

Elements to be controlled	Operating and recording procedures (elements)		Events and conditions affecting procedures
	From processing the transaction	From collateral activity	
Control of deposits:		1. Budgetary cash control and independent cash balance surveillance	1. Large checks only, making collection a matter of wide-spread management interest
Receipt identified	1. Listed upon receipt 2. Remittance advice saved		2. Numerous very small checks making mishandling cumbersome
Record Processing	1. Recorded independently of ledger clerk 2. Checked from opener's listings for date of deposit (a) Exceptions explored		3. Internal audit function
Deposit	1. Bank accounts reconciled; deposits in transit controlled by independent count		
Control of substitute credits:			

Billings:		1. Sales department interest in recorded sales
		   (a) Budgets
		   (b) Customer service
		   (c) Commissions
		 2. Monthly financials *agreed* with books and furnished to sales department
			1. Organization has only a few large shipments readily known widely by management
			 2. Budgetary control by a wide-spread management group supported by financials which are agreed with books
			 3. Internal audit function

(a) Shipments	1. Controlled shipping record 2. Shipments accounted for as billed		
(b) Recordings	1. Billings numerically controlled 2. Control established independently from ledger clerk		

FIGURE 2—*Continued*

Elements of System for Receipt of Monies from Credit Sales

Elements to be controlled	Operating and recording procedures (elements) From processing the transaction	From collateral activity	Events and conditions affecting procedures
Customer credits	1. Independent authorization 2. Supported by receivers for returned sales 3. Audited for validity 4. Recorded independently from ledger clerk 5. Numerically controlled	1. Sales department (a) Budgets (b) Operating problems (c) Commissions	1. Internal audit function
Write-offs (bad debts, etc.)	1. Independent and highly placed authorization		1. Size and concentration of accounts—credit character and ready recognizability of customer
Follow up of uncollected items		1. Frequent account agings 2. Uncollected accounts followed by independent credit department 3. Independent trial balancing	1. Size and concentration of accounts 2. Internal audit function
Control over access to other monies	1. Original remittance advice forwarded to ledger clerk (deters lapping)	1. Cash not accessible to handlers of checks 2. Bank transfers available	

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Anatomy of the Error-level Functional Module

Inspection of the Elements to be Controlled, shown on Figure 2, that can be found in a system for receiving monies without diversion, gives specifics on which to base some important conclusions: (1) Whether or not monies may be expected to be diverted need not be independent upon the existence, or the manner of application of one procedural element. (2) The interlocking of the elements provides the strongest and most meaningful assurance of whether or not there is compliance as to any one element. If one key element exists, a whole cluster must exist. (3) The non-existence of a control element, or low frequency in the number of times evidence exists of its application, is not of itself indicative of an error where it hurts: diversion or loss of assets.

There is an entire chain of systems available that can deter diversion of receipts that might result from failures in any one of the categories. Note that in Figure 2, the degree of control may be challenged in this sequence:

1) Are the incoming checks under direct control from the time of receipt until deposit?
2) If the incoming-check control suggests that checks could be diverted without a signal, is there any way to get rid of, or initially avoid the accountability charge on the books?
3) If the accountability charges are not eliminated, will there be effort to contact the customer?

This sequence of questions contemplates the manner in which major control elements interact. That there is extensive interaction of lower level elements with each other must also be apparent. At the major-control level the interactions extend to the elements comprising collateral activity, and to the nature of events and transactions, with the elements for controlling the processing of a transaction.

Reliance versus Understanding

Reference by the reader to the function of receiving monies, as an illustration, will help me convey what I believe the auditor must rely upon in order to formulate a judgment on the existence of deviant behavior—or non-congruence between that which is recorded and that which exists in fact.

It appears obvious to me that the auditor cannot simply use an inspection process methodology to observe unequivocal error signals that come from this module and conclude that an error does or does not exist. It also appears obvious to me that the auditor cannot rely upon the system to catch part of the errors and upon "substantive" auditing to catch an adequate portion of the remaining errors. There is only *one* error that either is discovered or not discovered: receipts of monies of a significant amount have been diverted. A realization about diversion either exists or does not exist in the auditor's mind.

In short, I do not believe that final *reliance* and, therefore, the confidence in a stated precision, comes from the sum of two *separate* contributions for discovering error. I believe there is only *one* source for an auditor's final reliance: the gut feel of a *critical,* competent human being who has developed an *understanding* (by combining hypotheses and empiric evidence) of the manner in which a functional role is being performed. In other words, the reliance of the auditor is belief in his judgment as to the nature of reality.

The *understanding* of the manner in which a functional role is being performed comes from asking questions and getting responses. Philosophers of science today assert that even in the most "objective" of sciences, understanding involves *intuitive* leaps. Understanding exists when a *critical,* competent person *feels* right. A critical person does not feel right unless he has touched base with an adequate number of his perceptions of facts, logical deductions, and visions of outcomes. His process is more simultaneous than sequential. Findings at one base don't settle the issues for the next base; bases cast light upon each other by being related like the chicken and the egg. The critical person touches base with countless perceptions that without conscious control present themselves to his mind; he considers whether or not they are relevant to the outcome he is struggling with. He gets hunches about relevance by combining the things he perceives; an answer satisfying to him may result. Above all he exercises judgment holistically.

In short, understanding is a creative act each time it occurs. Leaps occur that give new meaning to old facts. New relationships are faced, unexpected conclusions may be reached, stimulation for new follow-on steps may emerge. Decisions that come from reference to predetermined concepts are not creative. Perhaps the issue of how to make a decision by judgment is epitomized by the question of whether you *know* what you see, or you *see* what you know. I submit that creative thought is to know what you see. Reference to pre-established hierarchies leads to seeing only what you know, or worse yet, seeing what someone who isn't present once knew.

The Sample of One is Indispensable

If understanding comes from grasping and perceiving relationships among data which were initially unrelated; if achieving understanding is the process by which a human being makes a discovery; if understanding is built upon getting meaning from the answers to questions, then the sample of one is indispensable to auditing. The sample of one is the tool for asking those questions that can make answers meaningful. Inspection-type sampling of processing steps either is not pragmatic or is counterproductive for freeing the creativity needed to develop understanding—the creativity needed to discover.

From time to time, I have reached the same conclusions concerning a sample of one starting from different points than in this article: analysis by examining concrete and specific situations gives me particularly satisfying results about the pragmatism of such samples. For this article, however, space and time limit the presentation to mostly deductive arguments at abstract conceptual levels. To help somewhat in perceiving concretely the approach that I am advocating, an oversimplified illustration is presented.

Illustration of Auditing for Diverted Receipts

The functional module related to receipt of monies is utilized to provide an illustration solely because the material already provided in Figure 2 makes discussion of this module more understandable and meaningful.

In Company XYZ, the auditor finds a system that provides little direct control over checks received but little chance of substituting credits for any

diverted checks. He also finds that there is excellent follow-up by the credit department using an aged accounts receivable trial balance furnished by the ledger clerk. Thus, his overall view is that, in spite of lack of direct control over checks received, there is little opportunity for diversion of receipts, except that the aging furnished by the ledger clerk may not correspond with the data in the ledgers. Two alternatives may be considered for learning more about the attributes of monies received: either (1) compare the ledger with a recent aging furnished to the credit department, or (2) confirm with customers accounts with overdue balances. (It should be noted that, in this example, *one* test of the attributes of aging in the latter part of the period would be sufficient to form a judgment. At any point that the credit department receives valid information about accounts, the auditor's findings are that strong contact with the customer may be expected. Diverted receipts handled in this manner should not long remain undetected.) The auditor chose to confirm overdue accounts shown on the ledger, but since many accounts were with chain stores, confirmation replies received (after specific follow-up efforts) covered only a minor portion of these accounts.

Under these circumstances, the auditor determined that his next questions should be asked by performing either one or both of the following steps:

1) Compare the ledger with the most recent aged trial balance used by the credit department for follow-up.
2) Ask customers to confirm the unpaid status of specific past due invoices.

My experience leads me to believe that the methodology used by our illustrative auditor will give him a better basis than the usual auditor has for forming a judgment about receipt of monies. Current audit methodology would probably differ from that in the illustration in several important respects:

1) Non-replies to confirmation requests would not be followed by checking of an aged trial balance actually used by the credit department; chances are attempts to confirm specific overdue invoices would not be made. (The *meaning* of the customers' non-responses to the usual auditor would be different from that for the illustrative auditor of Company XYZ.)
2) Emphasis on confirming overdue accounts receivable would not be developed from the review of internal control.
3) Status of control over processing of checks would not affect the *number* of confirmation requests to *any* accounts. The issue concerning check processing would be weighed with other controls involving receivables to decide if control is weak, ordinary, strong, etc. At best, this evaluation would be the controlling influence on how *many* confirmations to send but it would not influence to whom they should be sent.
4) If the overdue customers' accounts were in the sample of confirmations requested, non-reply would not stir further action that differs from the action taken for non-reply to other customers' accounts.

If the two audit approaches are to be evaluated in terms of pragmatism for discovering diversion of receipts, then if diversion exists, the approach used in the illustration must be seen as superior. Information theory defines infor-

mation as the existence of interrelationships which constitute constraints upon behavior; thus information constitutes a *reduction* in the *uncertainty* of behavior—random behavior means non-existence of information, i.e. non-existence of, knowledge about relationships. More relationships concerning receipt of monies will be recognized by our illustrative auditor than by our usual auditor. There will be less uncertainty for our illustrative auditor (his gut can feel better) than there will be for our usual auditor if he were to consult his anatomy.

The problem for our current auditor, expressed in less formal language than by the use of information theory, is that he is not motivated by his methodology nor does he have adequate information with which to think through what he has available for judgment about a specific function. His methodology does not encourage finding interrelationships to give him a gut feel; his emphasis is on sufficient (as defined by authority) evidence to "verify" individual pieces as though they exist independently. So, for non-receipt of replies to confirmation requests, he refers to standards and practices for what to do next. He asks if he can accept examining subsequent payments of the account or if he must examine shipping records. He does not personally attempt to evaluate what the steps contribute to a particular situation on a particular audit; rather, he asks what he must do in order to comply with authority.

Sample-of-one Questions Find More Interrelationships

Broader inferences can be drawn from the illustration by relating the audit work done by the illustrative auditor to a conceptual framework. A framework for classifying the steps available to an auditor for increasing information (and thus reducing uncertainty) follows:

1) Ascertain *interconnections* that exist between transactions, events and entrepreneurial decisions, and direct processing steps, operating procedures, collateral material and recording decisions (the modules of Figure 2).

2) Ascertain the actual processing work done—this to include what was perceived by the worker, his response to what he perceived, the interactions with other work, and responses to that interaction. (Data needed to meaningfully determine the nature and quality of work done.)

3) Ascertain the nature of the audit trial and the extent of its existence.

4) Obtain representations from the sources of existing or potential transactions, events, and decisions and compare these representations with recordings in the accounting records. Representations from the source of the occurrence must not be taken from the medium or channel regularly used for communications to the accounting system.

5) Obtain representations from sources (both inside and outside the Company) other than the accounting records to develop data for casting light upon the existence of attributes of recorded information.

6) Develop symptoms by examining recorded representations and utilizing internal logic to channel inquiries directed to discovery of the non-existence of expected interconnections. (Internal logic refers to the dualisms which bring about expectations that a pair must exist if one thing is represented to exist. Some few examples are: interest

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expense with debt, property taxes and insurance with real property, current age of accounts with collectability and bona fides, twelve monthly charges with annually rented property, rise in sales prices with increased dollar amount of sales when there is no increase in physical deliveries.)

I maintain that opportunity for discovery increases when the mind has acquired an increase in data which is amenable to the forming of interrelationships which are specifically related to the objective. (Interrelationships are data converted into information.) On this premise, an increase in pragmatic power occurs in each of the classifications of audit steps shown above, if the steps are directed to developing separately information about each of the functional modules in which "errors" are significant to the user. For each such functional module, the following table shows how the relationship of each of the six audit-step classifications is viewed with respect to its usefulness for understanding the functional module, and in turn, to the usefulness of developing further information separately by sub-categories of the module.

| Audit-step classifi- cations | Usefulness for under- standing the module | Specific understanding needed for: | | |
		Categories of events, transactions and decisions	Short periods of time	Used in illustrative case
1.	Essential	Yes	Ordinarily no	Yes
2.	Impractical	Yes	Yes	No
3.	None	....	....	No
4.	Essential	Yes	Yes	Potentially yes—to con- firm specific overdues
5.	Essential	Yes	Ordinarily no	Yes
6.	Essential	Yes	Only as self- indicated	Yes (eg., aged trial balance, or confirm response)

Comments about the audit-step classifications and other items in this table follow.

Previous discussion has been directed to explaining why audit-step classifications 2 and 3 are indicated as having low priority when they are evaluated by the test of pragmatism and utility.

Audit-step classifications 1, 4, 5 and 6 are contemplated to contribute to the

final judgment only in their combination, not separately. For example, the non-return of confirmations (audit-step classification 5) in the illustrative case is also a symptom (audit-step classification 6) from which meaning emerges when related to information developed about interconnections (audit-step classification 1). But in turn, more is known about interconnections than can be gleaned from audit-step classification 1 standing by itself. The meaning given by audit-step classification 1 to results in the other audit-step classifications, creates meaning not previously existing. Thus, there is *no separate or additive reliance,* only an integrated reliance. The final reliance is based on *information not even partially present* in any one of the classifications *separately.*

Questions, incited or driven by symptoms relevant to a particular function, can be expected to lead to answers that give more information about each particular function than questions asked randomly (without being driven by symptoms) over all functions combined. Increase in information may similarly be expected to be developed with respect to transactions, events and decisions if questions are driven by symptoms relevant to individual categories underlying that which occurred in the business system. The existence of order (information) within each functional module about such things as geographic areas, large transactions, productive material versus supplies versus services, bar steel versus hardware, large customers, single source-of-supply vendors, etc., increases the opportunity for the mind to leap to creative relationships. In statistical theory, ascertaining whether one or more "universes" are present, also stratification, is somewhat analagous to developing specific understanding in significant categories. The impact of this upon a "sample of one" will be discussed shortly.

Attention is directed to the tremendous importance of directing audit-step classification 2 towards developing representations from the sources about the existence of *events and entrepreneurial decisions.* The utility of accounting information often may be more affected by these factors than by transactions. Non-directed questioning, or sampling (or even *completely* examining transactions), as a means of following the audit trail does not provide adequate understanding of significant events and entrepreneurial decisions.

Is understanding increased by isolating information to short periods of time throughout the year? The view reflected in the table is that only for audit-step classification 4 (representations from the sources about events, etc.) is time always significant. For audit-step classifications 1, 5 and 6, the nature of the initial inquiries casts light on whether a spread over time is significant. Ordinarily, audit-step classification 5 gives adequate understanding through inquiring about cumulative results. An example of such inquiring is in the illustrative case.

How the Sample of One Works

The assertion has been advanced that the discovery process for auditing is satisfactorily concluded when a *critical,* competent person *feels* right about interrelationships in his mind. The interrelationships consist of concepts and experiences that are relevant to objectives he has undertaken to accomplish. He has brought the interrelationships to that concluding point by asking questions prompted initially by his previously experienced relationships with analagous subject matter; his subsequent questions are prompted by the interrelationships

experienced after answers to his question are obtained. When he no longer is prompted to ask questions, he understands, he feels right, and he can shout *Eureka!* The shout expresses the satisfaction that comes from having successfully combined logic with an intuitive leap beyond that indicated by the data.

In my approach, the sample of one denotes a methodology for asking useful questions when one is engaged in the discovery process. For auditing, the sample of one embodies two concepts:

1) Each question is framed so that the answer is required to be in a form that eliminates ambiguity as to whether communication exists between questioner and responder. Wherever possible, this calls for answers in the form of an existing example that is responsive to a request to "Show me one."

2) Each question is designed in keeping with the expectation that the sample produced will provide information useful for framing a next question; expectations do not exist that samples will produce information that independently establishes or substantiates reality.

Since the incidence of questions is largely dependent upon the answer to the preceding question, an inherent quality of the sample of one is that the pattern of coverage will vary from engagement to engagement, as well as, from year to year. Consider that auditing with the objective of discovery is akin to hunting. A hunter catches up to his quarry by learning its fixed patterns; if a hunter's patterns are fixed, he can be made into the hunted.

A sample constituting one example provides optimal increase in information (relationships brought to mind) when it is obtained from a highly ordered process. The high degree of order removes uncertainty as to the meaning of the sample; its message is clear. A second example under these circumstances can give *no more nformation* than the first.

This concept of the relationship of order to meaning is evident when considering a blood sample. Only one sample is taken. Its meaning is clear because of the high degree of order that prevails in the blood system. Observe that the high degree of order removes uncertainty as to the meaning of the sample, but the order in no way removes uncertainty as to whether the blood will show deviant behavior (an error in good functioning).

The auditor's commonly held intuitive feeling that increased control in a system warrants a smaller sample must be founded upon this sense of needing fewer examples for understanding. However, there is no sound basis for the extension of the feeling about reduced uncertainty in understanding so that it includes reduced likelihood of error or deviant behavior. In statistical quality control deviant behavior is asked to speak for itself—it is not inferred from the orderliness of the machine that produces the product.

If "errors" must be discovered by developing increased information, a second sample of blood is not taken. Other interconnections are made. So in auditing, samples of one are logical, but it is not logical to use size samples where "strong" control exists. Note that if a system ordinarily expected to be orderly has no order, this too is determinable from a sample of one. If meaning is obliterated by uncertainty, then again, more meaningless samples do not increase information. For example, a sample of petty cash vouchers found to be prepared in pencil gives all the information obtainable from them—their

meaning for control is uncertain. Examination of more vouchers prepared in pencil will not reduce the uncertainty.

The concept embodied in a sample of one is applicable to all of the audit-step classifications deemed useful for the process of discovery. This covers classifications 1, 4, 5 and 6 previously discussed. What this contemplates for each category will be made more concrete.

For audit-step classification 1, ascertaining interconnections between occurrences with processing (including the interconnection between processing steps) and collateral material, the sample of one approach contemplated is straight forward. Following the concept that orderliness reduces uncertainty of understanding, the questioning is effected by drawing samples. This contemplates working along paths that reflect functional relationships, using representative categories of occurrences. For example, one payment voucher for each representative vendor, or for each representative material, service, etc. is traced through all of the elements related to the payment cycle. Holding the same sample throughout the processing cycle increases the information about the interconnections of the processing and of the occurrences. The same payment vouchers should be taken through the engineering department, the procurement department, the receiving department, etc., etc.

Answers received at each stage should always be utilized for framing the next question. Expectations of the manner of processing in related stages are developed from answers to questions. Answers received should be particularly considered for whether the sampled items in fact represent homogenous categories. Also note that an ambiguous answer always warrants or requires a new sample of one to determine whether the ambiguity is representative of what is to be found.

For audit-step classification 4, obtaining representation of occurrences from the source (sometimes including sources outside the company), the questioning initially follows the pattern just described. Working along functionally related paths the auditor looks for samples of representations of what in fact occurred. What's happened this year? Did prices go up? Has the number of customers increased with whom the company dealt? Have new products been developed? What has been the obsolescence problem? Have new markets been entered? Is the company getting advertising behind new products? Has the support of any products been dropped? Within each department the auditor would want to ask about what information is used for decision making, what written information there is concerning the matters discussed.

Representative samples of one, developed at the sources of occurrences, may be used to frame questions to the accounting recordings. In most cases it is likely that the question can best be asked by comparing an aggregation (either regularly available or specifically computed) from the source with an aggregation of results reflected by the accounting records. The concept previously given that identifies a sample of one is embodied in this form of questioning. It constitutes *one question* "designed with the expectation that the sample produced will provide information useful for framing a next question." The distinguishing characteristic of the sample of one is that the work is *one step* that is part of a purposeful process; it is not an inspection step that exists independently of the entire audit process.

In this same sense *random sampling* and statistical theory could be utilized to develop an estimate of the aggregate effect of occurrences, as represented by the source, for asking *one* question to obtain one sample about the recording of these occurrences.

For audit-step classification 5, obtaining representation from outside sources for casting light upon recorded attributes, the concept embodied in a sample of one is again present. This audit step is concerned with confirmation in its generic meaning—i.e., "added information." Nonaccounting-department data provides a source of confirmation that auditors seldom utilize.

For the sample of one philosophy to be followed, "substantive" audit steps must be converted from being viewed as the upper hierarchy of evidence (hard evidence) obtained to prove that an account balance is substantiated, to being information gathered for answering a question about the interconnections in a function.

For example, the existing practice with respect to customer confirmations replies records the dollar proportion of the total customer accounts that have been "confirmed." The initial selection of accounts to be confirmed is unrelated to a question about a function. The meaning of the replies cannot be and is not looked upon in the light of the interconnections that exist in those functional modules which are significant as to "error" characteristics.

To change this approach, the relationship which the customer's confirmation reply can have to the functional modules must be identified. These relationships are:

1) Bona fides of the account (the sales recording function)
2) Unpaid status of the account (the receipts diversion function)
3) Disputes over charges (the function of recording events that affect attributes to be recognized)

The initial requests for confirmation must be influenced by the next question that needs to be asked about these functional modules. As in the situation of the illustrative case, this both brings about different selections of accounts for confirmation and changes the meaning of the replies.

Where an attribute to be sampled is distributed over a large number of homogenous accounts, random sampling is appropriate. (But confidence limits are not a dependent variable of "reliance" upon control.) The aggregate result will permit asking one question for each attribute being sampled.

In the same way, confirmation (getting added information) must proceed in connection with each of the "error" functional modules. Particular emphasis must be placed upon the functional module relating to attributes; this stimulation may bring about the change in audit methodology that turns out to be the most significant.

Conclusions

The question How much testing is enough? asked so many times over the past forty years was the wrong question. We needed to first ask whether auditing is an inspection process or a discovery process. The right question was whether the auditing problem is to *see* what you know, or to *know* what you see. Further, we needed to make clear to ourselves that the resolution of this question is to be governed by pragmatism and utility to the user of information.

When this fundamental issue is resolved, the methodology to be used for sampling readily becomes clear. I believe resolution in terms of pragmatism and utility leads readily to the conclusion that auditing calls for methodology appropriate for asking questions about the nature of subject matter that does not emit unequivocal signals. Auditing is a process of discovery, not observation of signals. If the resolution were that auditing is an inspection process, the sample of one is indefensible; if auditing is to *know* what you see, the sample of one is indispensable. Our present methodology implies the pursuit of a philosophy of auditing consistent with seeing what you know.

The discovery process successfully functions as a mixture of science and intuition. Science must contribute guidelines that encourage and assist human creativity. I believe that the most important such guideline is that the audit effort should be built from, around and related to functional modules relevant to error determination. Clear identification by the profession of these modules is the first order of business. The conceptual analysis and comprehension of audit steps available, in the manner set forth in this article, also is an important guideline to assist creativity. Comprehension of the strengths, weaknesses, and nature of the methodology involved in the use of the sample of one, must be in the tool kit of a discoverer. Certainly not least, the auditor should know systems theory and technology and be highly conversant with business system practices.

The content of today's auditing standards is the most significant manifestation of the audit philosophy presently being advocated. When the standards assert that the auditing process is driven by symptoms, not by mandatory procedures, we will know that the auditor as a discoverer—as a creative human being—will have been encouraged.

I believe the most significant change that the sample-of-one philosophy of auditing would bring about is the new discoveries of the non-congruence between the representation and reality of attributes that come from events and entrepreneurial decisions. Relating the significance of auditing results to functional modules rather than dollar balances of accounts might even bring insights on dealing with the attribute which is an ever-present bogeyman—the going concern question.

Adoption of the advocated sample-of-one philosophy must introduce a challenge to the organization and professional staffing of public accounting firms. I believe the challenge is: can the responsibility to society, evaluated in terms of pragmatism and utility, be met by organizations designed for mass production and staffed with professionals educated and trained to be dependent upon direction and control from the top.

Footnotes

1. The views expressed are the author's; they do not necessarily correspond with those held by the author's firm.
2. See A. A. Sommer, Jr., "What Are the Courts Saying to Auditors?" *Auditing Looks Ahead*, Proceedings of the 1972 Touche Ross/University of Kansas Symposium on Auditing Problems.
3. The meaning given to "sample of one" is an extension of that presented in "Some Observations on Statistical Sampling in Auditing," by Howard F. Stettler, *The Journal of Accountancy*, April 1966. The meaning for the present paper emerges at later points in the paper.

4. See "Must We Revolutionize Our Methodology?" Robert A. Raitt, *Interfaces*, February 1974, pp. 1-10; "Science in the Systems Age," Russell L. Achoff, *Operations Research*, May-June 1973, pp. 661-671; "Reliability of Models in the Social Sciences," C. West Churchman, *Interfaces*, November 1973, pp. 1-12.

5. Barry B. Cushing, "A Mathematical Approach to the Analysis and Design of Internal Control Systems," *The Accounting Review*, January 1974, pp. 24-41.

6. *Ibid.*, p. 25.

7. *Ibid.*, p. 38.

8. *Ibid.*, p. 39.

9. *Ibid.*, p. 38.